The TENNESSEE CONSERVATIONIST

# Responsible Energy Use in Tennessee State Parks

**By Bill Avant**

Tennessee State Parks is striving to be more responsible and accountable for the energy being used at the state parks.

Efforts by park staff and management to be good stewards of the environment - as well as the taxpayer dollar - compel us to reduce waste and save energy. Some initiatives under consideration - or in the early phases of implementation - are partnering with Johnson Controls Inc., headquartered in Milwaukee, Wis., to develop strategies for energy conservation and the use of photovoltaic cells and geothermal; participation in TVA's Green Power Switch Program; and the use of "smart meters" to monitor energy use. In new construction, energy efficient, or sustainable items are considered in the design.

A growing energy crisis and a national discussion about the future of our natural resources are bringing the impact of our energy and conservation choices closer to home.

The state of Tennessee selected an energy services company (known as an ESCO) in July 2003 through a competitive procurement to develop and execute performance contracts in general government agencies. The ESCO selected was Johnson Controls Inc. A performance contract institutes facility improvements that pay for themselves over a period of time by reducing the utility bill. Johnson Controls guarantees the savings so the state is not at risk should there be a savings shortfall.

Along with reducing the utility bill there is also a positive effect on the environment by reducing harmful emissions.

Johnson Controls immediately began working with the Tennessee State Parks staff to develop projects at the state parks. The first project that the company developed was a joint project at Henry Horton and Pinson Mounds State Park. As of November 2004, this project is halfway through the development process. At Henry Horton State Park in Chapel Hill, this project will include a complete lighting retrofit to energy efficient lighting, HVAC upgrades to the inn, equipment upgrades at the restaurant, installation of an energy management system, and vending machine controls.

At Pinson Mounds State Park in Pinson, this project will also include the retrofitting of energy efficient lighting and the installation of an energy management system. Johnson Controls is in the final stages of proposing to replace the conventional HVAC system with a closed loop geothermal heat pump system. The geothermal system is more efficient than a conventional system because it uses the earth's constant temperature to add or remove heat to the closed loop HVAC system. The total

project price (for both parks) is $1.95 million. Tennessee State Parks will recognize annual savings of about $67,000 in operational costs from these projects.

In addition to the utility savings, 1,240,651 pounds of greenhouse gasses and other pollutants will be averted.

Johnson Controls has another project that is already developed and waiting funding in fiscal year 2005-2006. This project entails an energy efficient lighting upgrade at the following Tennessee State Parks: Norris Dam, Sycamore Shoals, Fall Creek Falls, Pickwick Landing, and Paris Landing.

The HVAC system will be replaced at Sycamore Shoals State Park. This HVAC system will be more energy efficient and the current one is at the end of its useful life. The total project price is $1 million. Tennessee State Parks will recognize annual savings from the energy efficient improvements and 2,239,082 pounds of greenhouse gasses and other pollutants will be averted.

Johnson Controls has a five to seven year contract with the state of Tennessee to provide performance-contracting services and will be working with the Tennessee State Parks organization every year to develop additional energy saving projects. This program is just one way that Tennessee State Parks is leading by example when it comes to the responsible use of energy and our natural resources.

The Tennessee State Park system is interested in supporting the use of renewable energy resources to help improve the environment by purchasing Green Power. As the Green Power Switch Web site states: "Green Power Switch is a renewable energy initiative that offers consumers in the Tennessee Valley a choice in the type of power they buy. TVA and local public power companies, working in cooperation with the environmental community, developed Green Power Switch as a way to bring green power—electricity that's generated by cleaner, renewable resources such as solar, wind, and methane gas—to Valley consumers."

Recently, there has been a calculation that represents the estimated pounds of emissions attributed to the total electricity our state parks consumed in one year in Tennessee. The annual kilowatt-hour use is approximately 32,500,000. This breaks down into 126,558 pounds of Nitrogen Oxide, 316,985 pounds of Sulfur Dioxide, and 48,627,821 pounds of Carbon Dioxide.

There are about 40 of Tennessee State Parks that are located where the Green Power Switch is available. If Tennessee State Parks is able to purchase the minimum number of blocks to participate in the Green Power Switch, we will be purchasing approximately 1,000 blocks each month. So, what does this all mean? If my Excel spreadsheet is working right, by our participating in TVA's Green Power Switch, we will be averting approximately 2,717,798 greenhouse gases each year!

Let's put it another way… Using information from , recycling 1 ton of paper saves 4,077 kwh of energy, which equates to a purchase of 1,000 blocks of Green Power for one year is like recycling 883,000 pounds of paper. Similarly, buying 1,000 blocks of Green Power for one year is like recycling 240,000 pounds of aluminum, or 7,661,000 cans.

Why does green power cost more? According to the Green Power Switch Web site, although renewable sources like sunlight and wind are free, the technology used to capture the energy they produce is still more expensive than traditional power generation methods. Increased demand may lead to expanded power production capacity and eventually to lower costs.

Where are Green Power Switch's generation sites located? TVA has built the first commercial wind-powered turbines in the southeastern United States on Buffalo Mountain in Anderson County. Solar generation sites are located in the service areas of participating public power companies. And methane gas is providing power at Allen Fossil Plant in Memphis, where a methane waste by-product from the city's wastewater treatment plant is used for co-firing.

The first "smart meter" in the park system will soon be installed at Fall Creek Falls. This jazzed-up electric meter will allow park management to log in to a Web site where they will have access to utility readings from the previous day, based on 30-minute increments. By monitoring our energy usage, we can develop a load profile of our consumption patterns. This profile will reveal our time-of-use, peak

usage and usage efficiency. Also, by monitoring, recording, analyzing and responding to power quality problems in real-time, we can continue to drive down our energy costs and strive towards operating at optimum efficiency.

The software that we will be using lets management retrieve data from any hosting system, create a master reporting system, and incorporate new information. This service will inform us in real time of the most cost efficient time to operate on-site units and allow for immediate response. Communications on a 24-hour/seven day basis will alert management, via email or pager, when certain set points are not realized. This turns what is typically reactive management into proactive management.

"Here in Tennessee the Memphis Sharp Solar manufacturing plant produces over 40 Mega Watts of panels a year - there is nothing ‘grass roots’ about that factory!" states Gil Melear-Hough of Southern Alliance for Clean Energy. "The Renewable Portfolio Standard passed last month in Colorado will soon add that state to the list of states with booming wind and solar markets. Solar and wind are one and two, on the fastest growing energy producers in the world.

"Cumulative global wind energy generating capacity topped 39,000 megawatts (MW) of wind and reached 39,294 MW at the end of 2003. New equipment totaling 8,133 MW in capacity was installed worldwide during the year, an increase of 26 percent, according to estimates by the American Wind Energy Association and the European Wind Energy Association. Wind plants now power the equivalent of 9 million average American homes (19 million average European homes) worldwide. Some $9 billion were invested in new wind power generating equipment in 2003, up from $7 billion in 2002."

The Tennessee State Parks is a great place to help enhance the awareness that solar technology works, creates jobs, has dramatic non-pollution benefits (both for human health and climate), and we are in a period where the demand for gas and oil will very soon exceed demand. Also, The Kyoto Protocol contains legally binding emissions standards requiring 36 industrialized countries to reduce their combined greenhouse-gas emissions by at least five percent below their 1990 levels by 2012. The U.S., not being one of the counties to sign the Kyoto Protocol, will be directly affected due to U.S. operations in other places. In short the U.S., and yes even here in Tennessee, will be heavily dependent on renewable technologies in the not too distant future. I would suggest that the state parks in Tennessee would be the perfect place to start bringing this technology in a meaningful, planned way to the state. To start making the kind of consistent solar commitment being made by many government bodies nationally would help Tennessee prepare for the future of energy. This kind of dependable infrastructure growth will help keep Tennessee competitive in the developing world of the 21st Century.

To find out more, visit the following Web sites:
Green Power Switch: http://www.tva.gov/greenpowerswitch/ green_mainfaq.htm/.
Aluminum Recycling: www.deq.state.la.us/assistance/ recycling/home/aluminum.htm/.

**(Bill Avant is a planner for Tennessee State Parks, based in Nashville.)**